Production of olive oil organogels: Influence of candelilla wax concentration on physicochemical properties

Silva, P., Fasolin. L., Martins, A., Vicente, A. A.

CEB - Centre of Biological Engineering, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal

Presenting author: Vicente, A. A.; +351 253 604 419; avicente@deb.uminho.pt

Edible oils have potential health benefits in comparison to saturated and/or trans fats usually employed in food products. Conferring structure to these oils can allow a greater range of applications, improving and differentiating its applicability, including their use as spreadable products. Thus, the aim of this work was developing an olive oil organogel, foreseeing its application in the food industry. Olive oil was used for the production of the organogels, along with candelilla wax (CW) as organogelator (1% to 6% (w/w)) that was solubilized under magnetic stirring at 90 ºC and then cooled to room temperature. Systems were evaluated according to their oxidation stability through peroxide values (PV), mechanical and rheological (flow curves and non-isothermal oscillatory sweeps) properties. Thermal analysis was also conducted using a DSC. Olive oil and commercial butter were used as control in oxidative stability and textural analyzes, respectively. Results showed that an increase in CW concentration increased the textural parameters. In addition, at a concentration of 5%, results between butter and organogel were extremely similar (organogel firmness of 12.25 N and spreadability of 10.38 N/sec; butter firmness of 10.29 N and spreadability of 10.15 N/sec). Rheological and DSC results also showed an increase in all parameters evaluated (thixotropy, initial viscosity, onset temperature, enthalpy) with CW concentration increase. Melting point of organogels was also determined by non-isothermal rheology and allows a comparison with DSC results. There was similar trend with increasing concentration, however a gap was observed, since different mechanisms are involved in each measurement. Oxidative stability was assessed (63 days), and results showed that, while an increase with time exists, its within normal values (maximum PV value at 63 days of 1.47 milliequivalents of peroxide per kg), and all organogel samples were bellow pure olive oil. In short, results showed that by changing the concentration of gelator used, physicochemical properties can be tailored, and in some conditions an organogel with similar properties to commercial products can be produced. Thus, an industrial application can be easily projected, since olive oil is a healthier alternative to commercial butters and other spreadable products.